5   We Claim:

1.   A complex order processing system comprising:

a plurality of business service methods;

user interface instructions operable to:

generate a customer portal view comprising a list of products and services

10   associated with an account, a list of quotes associated with the
account, a list of orders associated with the account, and a plurality
of user-selectable options;

receive input from a user; and

a plurality of workflow processes, wherein at least one of the plurality of

15   workflow processes is invoked when a user selects one of the plurality of
user-selectable options, and the at least one of the plurality of workflow
processes invokes at least one of the plurality of business service methods
to perform functions associated with the selected option.

2.   The complex order processing system of claim 1, further comprising a

20   plurality of complex objects, wherein each complex object is based on a property set of at
least one of: a complex asset, a quote, and an order; and the business service methods
include at least one of:

an Apply Method to create a hybrid asset/order that simulates the future

configuration of the complex asset by overlaying unprocessed items and

25   attributes from open orders on one of the plurality of complex objects that
is based on the complex asset;

a Delta Method to generate a delta complex object that represents the difference

between at least two of the plurality of complex objects;

a Trim Method to create a new complex object by eliminating all items that meet

30   predefined trim criteria from one of the plurality of complex objects;

a Logical Delete Method to generate a transformed delta order complex object by

transforming items in one of the plurality of complex objects with an
action code "Delete" to "Update" and changing status of the transformed
items to "Inactive";

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an Explode Method to copy items in one of the plurality of complex objects with
quantity greater than one, and generate a delta quote complex object with a
corresponding number of copies of the item with quantity equal to one;

a Fully Exploded Method to determine whether the items in one of the plurality of
complex objects have a quantity greater than one;

a Field Delta Method to set the action code of a parent quote item to "Update"
when a specified field is updated;

a Set Effectivity Dates Method to generate an "Effective End Date", an "Effective
Start Date", and a "Completed Date";

a Set Action Method to set the action code of an item in one of the plurality of
complex objects;

a Save Object Method to receive a key and a property set hierarchy that represents
one of the plurality of complex objects, and saves the one of the plurality
of complex objects in a string to object map using the key;

a Get Object Method to receive the key and return the one of the plurality of
complex objects that corresponds to the key;

a Reset Method to delete all saved complex objects from the map;

a Module Licensed Method to determine whether the complex order processing
system is licensed for a particular computer system;

an Update Order Status Method to check a Status field of a root item and all child
items in the hierarchy of one of the plurality of complex objects based on a
complex asset to determine whether the Status field is set to "Complete",
"Failed" or NULL;

a Merge Method to copy all items from one of the plurality of complex objects to
another of the plurality of complex objects;

a Set Field Method to enumerate through the item hierarchy of one of the plurality
of complex objects, find a named field of each item, and set the named
field to a specified value; and

a Create Empty Complex Object Method to create an empty complex object based
on one of the plurality of complex objects.

3. The complex order processing system of claim 2, wherein the workflow processes include at least one of:

a New Products and Services Process to create a quote;

a Modify Products and Services Process to modify a complex asset in a quote;

a Disconnect Products and Services Process to disconnect a complex asset;

a Profile Process to retrieve account information that corresponds to a quote;

an Edit Quotes Line Items Process to apply all active and unprocessed orders to a complex asset to generate the future state of the complex asset, and allow the user to make changes to the configuration of the complex asset and update a quote;

a Supplemental Orders Process to create a new order by allowing the user to revise a pending order;

an Edit Order Line Items Process to apply all active and unprocessed orders to a complex asset to generate the future state of the complex asset, allow the user to make changes to the configuration of the complex asset, and update an order;

a Quote to Order Process to convert a quote to a sales order;

an Update Opportunity Process to create revenue items for all quote line items;

a Submit Order Process to associate account information with each line item in an order and set the status of the order to "open";

an Ungroup Quotes Process to create multiple copies of line items in a quote that have quantities greater than one;

an Apply Completed Sales Order Line Item To Service Profile Process to update an asset table for a complex asset that has been provisioned; and

a Move Process to transfer a customer's complex asset configuration from an old location to a new location by entering the address of the new location and entering a single option selection.

4. The complex order processing system of claim 3, wherein the New Products and Services Process is operable to:

retrieve a selected quote;

create a new quote if no quote is selected;

5   designate the billing and service accounts; and

display the active quote.

5.   The complex order processing system of claim 3, wherein the Modify

Products and Services Process is operable to:

retrieve the quote that is selected;

10   create the quote if no quote is selected;

allow the user to make changes to the currently requested state of the complex

asset;

apply changes specified by all open and pending orders related to the complex

asset to simulate the state of the service product;

15   return an empty asset when the open and pending order disconnects a root

component of the complex asset;

allow the user to change the configuration of the complex asset when the complex

asset is customizable;

update the quote with the change between the previously requested state of the

20   complex asset and the newly requested state of the complex asset; and

store the updated quote.

6.   The complex order processing system of claim 3, wherein the Disconnect

Products and Services Process is operable to:

retrieve the quote that is selected;

25   create the quote if no quote is selected; and

allows the user to disconnect the complex asset, and create a quote line item with

the complex asset disconnected.

7.   The complex order processing system of claim 3, wherein the Edit Quotes

Line Items Process is operable to:

30   determine whether the status of the action code of an order line item is "Add";

generate the requested future state of the complex asset by applying the prior

active and unprocessed orders to the complex asset;

apply the current quote line item to the complex asset;

display the currently requested state of the complex asset and allow the user to

reconfigure the complex asset; and

generate the difference between the requested state of the complex asset before the

current order line item was applied and the state of the asset after the user

reconfigured the complex asset.

8.   The complex order processing system of claim 3, wherein the Edit Order

Line Items Process is operable to:

determine whether the status of the action code of an order line item is "Add";

generate the requested future state of the complex asset by applying the prior

active and unprocessed orders to the complex asset;

apply the current order line item to the complex asset;

display the currently requested state of the complex asset and allow the user to

reconfigure the complex asset; and

generate the difference between the requested state of the complex asset before the

current order line item was applied and the state of the asset after the user

reconfigured the complex asset; and

ungroup any order line item with a quantity of more than 1 into multiple line

items, each with a quantity of 1.

9.   The complex order processing system of claim 3, wherein the Quote to

Order Process is operable to:

ungroup any order line item that is tracked as an asset with a quantity of more than

1 into multiple line items, each with a quantity of 1

create a new order based on the quote;

set the order type of the new order to "Sales Order";

set the order status of the new order to "New"; and

set the status of each order line item "New" if the action field is non-null.

10.   The complex order processing system of claim 3, wherein the Update

Opportunity Process is operable to:

read the quote line items for a selected quote from the database.

read the revenue items associated with any opportunity related to the selected

quote;

5   delete existing revenue items for the selected quote;

create revenue items for each quote line item that has at least one of the following:

      an action code of Add or Update;

      a price type that is not Usage; and

      an extended quantity that is not zero.

10   11.   The complex order processing system of claim 3, wherein the Submit Order Process is operable to:

      determine whether the order status is not Open;

      an order header with account information;.

      propagate the account information to line items in the order;

15   set the status of the order to Open; and

      set the status of pending line items to Open.

      12.   The complex order processing system of claim 3, wherein the Apply Completed Sales Order Line Item To Service Profile Process is operable to:

      update an Order Item Processed flag of the topmost order line item based on whether all line items have a status of Complete.

20   trim any incomplete or failed changes from the order line items whose products are not tracked as assets, line items whose status is not Complete, and line items whose action code is "-";

      convert action codes of the order line items from Delete to Update;

25   load the complex asset associated with the order line item from the database;

      create a new complex asset if there is no complex asset associated with the order line item;

      apply the order line item to the complex asset; and

      store the complex asset.

30   13.   The complex order processing system of claim 3, wherein the Move Process is operable to:

      identify a move-out address;

      identify a move-in address;

      retrieve the complex assets for the move-out address;

generate a move-in quote with line items from the complex assets for the move-
out address;

add account information from the complex asset for the move-out address to the
move-in quote;

generate two quote line items for each quote line item in the move-out quote,
wherein one quote line item has an action code of Delete and is associated
with the move-out address, and the other quote line item has an action
code of Add and is associated with the move-in address.

specify a completed date for the move-out quote;

assign a service point to each quote line item to be connected in the move-in
quote; and

specify a connect date for the move-in quote.

14.   The complex order processing system of claim 2, wherein the Apply
Method is operable to:

retrieve a complex asset representing a customizable product;

overlay unprocessed items and attributes of the customizable product from all of
the open orders on the complex asset, wherein all of the open orders are
represented in a property set in chronological order;

generate a new property set representing the combination of the complex asset and
the open orders; and

set the hierarchy of the new property set to reflect the hierarchy of the open order.

15.   The complex order processing system of claim 2, wherein the Delta
Method is operable to:

determine when a change in the hierarchy occurs between a non-primary complex
object and a primary complex object;

allow the user to indicate item fields and attributes in the two complex objects to
be compared;

change the action code of an item to 'Add' when a new product is included in the
non-primary complex object and not included in the primary complex
object;

5   change the action code of an item to 'Delete when a new product is included in the
primary complex object and not included in the non-primary complex
object;

change the action code of a child item to 'Update' when no other action is
indicated;

10   change the action code of an item to 'Update' when the non-primary complex
object's item and corresponding attribute(s) are added to the primary
complex object; and

change the action code of the attribute of the item to:

'Update' when the attribute data has changed;

15   'Add' when the attribute has been added;

'Delete' when the attribute has been deleted; and

'-' (blank) when the attribute data has not changed,

when the action code of an item is changed to 'Update'.

16.   The complex order processing system of claim 3, wherein the Trim

20   Method is operable to:

receive a complex object, wherein the complex object represents a quotes, orders,
and a service profile;

receive a trim specification, wherein the trim specification is a delta order

begin with the top-most item in the complex object hierarchy, and proceeds

25   recursively down through the root items to the trim any items and the
children of the items that match criteria in the trim specification; and

allow syntax for the trim specification to support arithmetic functions and logical
operators.

17.   The complex order processing system of claim 3, wherein the Explode

30   Method is operable to:

change the quantity of the line item if the action code on the line item is 'Add';
and

recognize a list of fields that should not be copied.

18. The complex order processing system of claim 3, wherein the Set Effectivity Dates Method is operable to:

generate the "Effective End Date" based on the date the action code of an item was set to "delete";

generate a "Calculated Effective Start Date" which is set to the date the action code of the item was set to "add"; and

generate a "Completed Date" based on the date the order was completed.

19. An order processing system comprising:

a complex object comprising at least one of: a service profile, quote information, and order information pertaining to an account;

a data manager operable to

receive at least a portion of the service profile from an external server via an information network; and

generate a business object based on the portion of the service profile; and

a transformation engine operable to generate at least a portion of the complex object based on the business object.

20. The order processing system of claim 19, further comprising:

user interface instructions operable to:

generate a customer portal view comprising a list of products and services associated with the account, a list of quotes associated with the account, a list of orders associated with the account, and a plurality of user-selectable options; and

receive data input from a user.

21. The order processing system of claim 19, further comprising:

a plurality of business service methods to perform functions associated with processing orders.

22. The order processing system of claim 21, further comprising:

a plurality of workflow processes, wherein each workflow process invokes at least one of the plurality of business service methods.

23. The order processing system of claim 20, further comprising:

instructions operable to update the status of order line items when a provisioning
system completes all or part of an order.

a plurality of business service methods;

user interface instructions operable to:

generate a customer portal view comprising a list of products and services
associated with an account, a list of quotes associated with the
account, a list of orders associated with the account, and a plurality
of user-selectable options;

receive input from a user; and

a plurality of workflow processes, wherein at least one of the plurality of
workflow processes is invoked when a user selects one of the plurality of
user-selectable options, and the at least one of the plurality of workflow
processes invokes at least one of the plurality of business service methods
to perform functions associated with the selected option.

24. The complex order processing system of claim 23, further comprising a
plurality of complex objects, wherein each complex object is based on a property set of at
least one of: a complex asset, a quote, and an order; and the business service methods
include at least one of:

an Apply Method to create a hybrid asset/order that simulates the future
configuration of the complex asset by overlaying unprocessed items and
attributes from open orders on one of the plurality of complex objects that
is based on the complex asset;

a Delta Method to generate a delta complex object that represents the difference
between at least two of the plurality of complex objects;

a Trim Method to create a new complex object by eliminating all items that meet
predefined trim criteria from one of the plurality of complex objects;

a Logical Delete Method to generate a transformed delta order complex object by
transforming items in one of the plurality of complex objects with an
action code "Delete" to "Update" and changing status of the transformed
items to "Inactive";

an Explode Method to copy items in one of the plurality of complex objects with
quantity greater than one, and generate a delta quote complex object with a
corresponding number of copies of the item with quantity equal to one;

a Fully Exploded Method to determine whether the items in one of the plurality of
complex objects have a quantity greater than one;

a Field Delta Method to set the action code of a parent quote item to "Update"
when a specified field is updated;

a Set Effectivity Dates Method to generate a "Calculated Effective End Date", a
"Calculated Effective Start Date", and a "Completed Date", wherein the
"Calculated Effective End Date" is set to the date the action code of an
item in one of the plurality of complex objects based on an order was set to
"delete", the "Calculated Effective Start Date" is set to the date the action
code of the item in the one of the plurality of complex objects was set to
"add", and the "Completed Date" is set to the date the order was
completed;

a Set Action Method to set the action code of an item in one of the plurality of
complex objects;

a Save Object Method to receive a key and a property set hierarchy that represents
one of the plurality of complex objects, and saves the one of the plurality
of complex objects in a string to object map using the key;

a Get Object Method to receive the key and return the one of the plurality of
complex objects that corresponds to the key;

a Reset Method to delete all saved complex objects from the map;

a Module Licensed Method to determine whether the complex order processing
system is licensed for a particular computer system;

an Update Order Status Method to check a Status field of a root item and all child
items in the hierarchy of one of the plurality of complex objects based on a
complex asset to determine whether the Status field is set to "Complete",
"Failed" or NULL;

a Merge Method to copy all items from one of the plurality of complex objects to
another of the plurality of complex objects;

a Set Field Method to enumerate through the item hierarchy of one of the plurality of complex objects, find a named field of each item, and set the named field to a specified value; and

a Create Empty Complex Object Method to create an empty complex object based on one of the plurality of complex objects.

25.   The complex order processing system of claim 21, wherein the workflow processes comprise:

a Supplemental Orders Process to create a new order by allowing the user to revise a pending order, wherein the Supplemental Orders Process is operable to:

generate the requested future state of the complex object by applying the prior active and unprocessed orders to the complex object;

apply a current order line item to the complex object;

allow the user to reconfigure the complex object;

generate the difference between the requested state of the complex object before the current order line item was applied and the state of the object after the user reconfigured the complex object; and

ungroup any order line item with a quantity of more than 1 into multiple line items, each with a quantity of 1.

26.   The complex order processing system of claim 21, wherein the workflow processes comprise:

a Move Process to transfer a customer's complex asset configuration from an old location to a new location by entering the address of the new location and entering a single option selection to transfer the complex asset configuration from the old location to the new location.

27.   The complex order processing system of claim 21, further comprising a plurality of complex objects, wherein each complex object is based on a property set of at least one of: a complex asset, a quote, and an order; and the workflow processes comprise at least one of:

a New Products and Services Process to create a quote;

a Modify Products and Services Process to modify a complex asset in a quote;

a Disconnect Products and Services Process to disconnect a complex asset;

a Profile Process to retrieve account information that corresponds to a quote;

an Edit Quotes Line Items Process to apply all active and unprocessed orders to a
complex asset to generate the future state of the complex asset, and allow
the user to make changes to the configuration of the complex asset and
update a quote;

a Supplemental Orders Process to create a new order by allowing the user to
revise a pending order;

an Edit Order Line Items Process to apply all active and unprocessed orders to a
complex asset to generate the future state of the complex asset, allow the
user to make changes to the configuration of the complex asset, and update
an order;

a Quote to Order Process to convert a quote to a sales order;

an Update Opportunity Process to create revenue items for all quote line items;

a Submit Order Process to associate account information with each line item in an
order and set the status of the order to "open";

an Ungroup Quotes Process to create multiple copies of line items in a quote that
have quantities greater than one;

an Apply Completed Sales Order Line Item To Service Profile Process to update
an asset table for a complex asset that has been provisioned; and

a Move Process to transfer a customer's complex asset configuration from an old
location to a new location by entering the address of the new location and
entering a single option selection.

28.   The complex order processing system of claim 27, wherein the Modify
Products and Services Process is operable to:

retrieve the quote that is selected;

create the quote if no quote is selected;

allow the user to make changes to the currently requested state of the complex
asset;

apply changes specified by all open and pending orders related to the complex
     asset to simulate the state of the service product;

return an empty asset when the open and pending order disconnects a root
     component of the complex asset;

allow the user to change the configuration of the complex asset when the complex
     asset is customizable; and

update the quote with the change between the previously requested state of the
     complex asset and the newly requested state of the complex asset.

29.   The complex order processing system of claim 27, wherein the Edit
Quotes Line Items Process is operable to:

determine whether the status of the action code of an order line item is "Add";

generate the requested future state of the complex asset by applying the prior
     active and unprocessed orders to the complex asset;

apply the current quote line item to the complex asset;

display the currently requested state of the complex asset and allow the user to
     reconfigure the complex asset; and

generate the difference between the requested state of the complex asset before the
     current order line item was applied and the state of the asset after the user
     reconfigured the complex asset.

30.   The complex order processing system of claim 27, wherein the Edit Order
Line Items Process is operable to:

determine whether the status of the action code of an order line item is "Add";

generate the requested future state of the complex asset by applying the prior
     active and unprocessed orders to the complex asset;

apply the current order line item to the complex asset;

display the currently requested state of the complex asset and allow the user to
     reconfigure the complex asset; and

generate the difference between the requested state of the complex asset before the
     current order line item was applied and the state of the asset after the user
     reconfigured the complex asset; and

5   ungroup any line items in the complex asset with a quantity of more than 1 into
multiple line items, each with a quantity of 1.

31.   The complex order processing system of claim 27, wherein the Apply
Completed Sales Order Line Item To Service Profile Process is operable to:

update an Order Item Processed flag of the topmost order line item based on
10   whether all line items have a status of Complete.

trim any incomplete or failed changes from the order line items whose products
are not tracked as assets, line items whose status is not Complete, and line
items whose action code is "-";

convert action codes of the order line items from Delete to Update;

15   load the complex asset associated with the order line item from the database;

create a new complex asset if there is no complex asset associated with the order
line item; and

apply the order line item to the complex asset.

32.   The complex order processing system of claim 27, wherein the Move
20   Process is operable to:

identify a move-out address;

identify a move-in address;

retrieve the complex assets for the move-out address;

generate a move-in quote;

25   add account information from the complex asset for the move-out address to the
move-in quote;

generate two quote line items for each quote line item in the move-out quote,
wherein one quote line item has an action code of Delete and is associated
with the move-out address, and the other quote line item has an action
30   code of Add and is associated with the move-in address;

specify a completed date for the move-out quote; and

assign a service point to each quote line item to be connected in the move-in
quote.

33. The complex order processing system of claim 24, wherein the Apply Method is operable to:

instructions to retrieve a complex asset representing a customizable product;

instructions to overlay unprocessed items and attributes of the customizable product from all of the open orders on the complex asset, wherein all of the open orders are represented in a property set in chronological order;

instructions to generate a new property set representing the combination of the complex asset and the open orders; and

instructions to set the hierarchy of the new property set to reflect the hierarchy of the open order.

34. The complex order processing system of claim 24, wherein the Delta Method is operable to:

determine when a change in the hierarchy occurs between a non-primary complex object and a primary complex object;

allow the user to indicate item fields and attributes in the two complex objects to be compared;

change the action code of an item to 'Add' when a new product is included in the non-primary complex object and not included in the primary complex object;

change the action code of an item to 'Delete when a new product is included in the primary complex object and not included in the non-primary complex object;

change the action code of a child item to 'Update' when no other action is indicated;

change the action code of an item to 'Update' when the non-primary complex object's item and corresponding attribute(s) are added to the primary complex object; and

change the action code of the attribute of the item to:

'Update' when the attribute data has changed;

'Add' when the attribute has been added;

'Delete' when the attribute has been deleted; and

'-' (blank) when the attribute data has not changed,

when the action code of an item is changed to 'Update'.

35.   The complex order processing system of claim 24, wherein the Trim

Method is operable to:

receive a complex object, wherein the complex object represents a quotes, orders,

and a service profile;

receive a trim specification, wherein the trim specification is a delta order

begin with the top-most item in the complex object hierarchy, and proceeds

recursively down through the root items to the trim any items and the

children of the items that match criteria in the trim specification; and

allow syntax for the trim specification to support arithmetic functions and logical

operators.

36.   An apparatus for processing orders comprising:

a plurality of business service methods;

means for generating a customer portal comprising a list of products and services

associated with an account, a list of quotes associated with the account, a

list of orders associated with the account, and a plurality of user-selectable

options, wherein the customer portal is accessible by users including

customer service representatives, customers, and service providers for the

customers;

means for receiving input from a user; and

means for invoking a workflow process, and the workflow process invokes at least

one of the plurality of business service methods to perform functions

associated with the selected option;

means for receiving at least one of: a service profile, quote information, and order

information pertaining to an account from an external server;

means for generating a business object based on the at least one of: a service

profile, quote information, and order information; and

means for transforming at least a portion of the business object to a complex

object.

37.   The apparatus of claim 36, further comprising:

instructions operable to update the status of order line items when a provisioning

system completes all or part of an order.

38.   The apparatus of claim 36, wherein the plurality of business service

methods include at least one of:

an Apply Method to create a hybrid asset/order that simulates the future

configuration of the complex asset by overlaying unprocessed items and

attributes from open orders on one of the plurality of complex objects that

is based on the complex asset;

a Delta Method to generate a delta complex object that represents the difference

between at least two of the plurality of complex objects;

a Trim Method to create a new complex object by eliminating all items that meet

predefined trim criteria from one of the plurality of complex objects;

a Logical Delete Method to generate a transformed delta order complex object by

transforming items in one of the plurality of complex objects with an

action code "Delete" to "Update" and changing status of the transformed

items to "Inactive";

an Explode Method to copy items in one of the plurality of complex objects with

quantity greater than one, and generate a delta quote complex object with a

corresponding number of copies of the item with quantity equal to one;

a Fully Exploded Method to determine whether the items in one of the plurality of

complex objects have a quantity greater than one;

a Field Delta Method to set the action code of a parent quote item to "Update"

when a specified field is updated;

a Set Effectivity Dates Method to generate a "Calculated Effective End Date", a

"Calculated Effective Start Date", and a "Completed Date", wherein the

"Calculated Effective End Date" is set to the date the action code of an

item in one of the plurality of complex objects based on an order was set to

"delete", the "Calculated Effective Start Date" is set to the date the action

code of the item in the one of the plurality of complex objects was set to

5   "add", and the "Completed Date" is set to the date the order was
     completed;
     a Set Action Method to set the action code of an item in one of the plurality of
     complex objects;
     a Save Object Method to receive a key and a property set hierarchy that represents
10   one of the plurality of complex objects, and saves the one of the plurality
     of complex objects in a string to object map using the key;
     a Get Object Method to receive the key and return the one of the plurality of
     complex objects that corresponds to the key;
     a Reset Method to delete all saved complex objects from the map;
15   a Module Licensed Method to determine whether the complex order processing
     system is licensed for a particular computer system;
     an Update Order Status Method to check a Status field of a root item and all child
     items in the hierarchy of one of the plurality of complex objects based on a
     complex asset to determine whether the Status field is set to "Complete",
20   "Failed" or NULL;
     a Merge Method to copy all items from one of the plurality of complex objects to
     another of the plurality of complex objects;
     a Set Field Method to enumerate through the item hierarchy of one of the plurality
     of complex objects, find a named field of each item, and set the named
25   field to a specified value; and
     a Create Empty Complex Object Method to create an empty complex object based
     on one of the plurality of complex objects.

     39.   The apparatus of claim 36, wherein the workflow process comprises:
     a Supplemental Orders Process to create a new order by allowing the user to
30   revise a pending order, wherein the Supplemental Orders Process
     comprises:
     means to generate the requested future state of the complex object by applying the
     prior active and unprocessed orders to the complex object;
     means to apply a current order line item to the complex object;
35   means to allow the user to reconfigure the complex object; and

5   means to generate the difference between the requested state of the complex
         object before the current order line item was applied and the state of the
         object after the user reconfigured the complex object; and
     means to ungroup any order line item with a quantity of more than 1 into multiple
         line items, each with a quantity of 1..

10   40.   The apparatus of claim 36, wherein the workflow process comprises:
     a Move Process to transfer a customer's complex asset configuration from an old
         location to a new location by entering the address of the new location and
         entering a single option selection to transfer the complex asset
         configuration from the old location to the new location.

15   41.   The apparatus of claim 36, wherein the workflow process comprises at
least one of:
     a New Products and Services Process to create a quote;
     a Modify Products and Services Process to modify a complex asset in a quote;
     a Disconnect Products and Services Process to disconnect a complex asset;
20   a Profile Process to retrieve account information that corresponds to a quote;
     an Edit Quotes Line Items Process to apply all active and unprocessed orders to a
         complex asset to generate the future state of the complex asset, and allow
         the user to make changes to the configuration of the complex asset and
         update a quote;
25   a Supplemental Orders Process to create a new order by allowing the user to
         revise a pending order;
     an Edit Order Line Items Process to apply all active and unprocessed orders to a
         complex asset to generate the future state of the complex asset, allow the
         user to make changes to the configuration of the complex asset, and update
30   an order;
     a Quote to Order Process to convert a quote to a sales order;
     an Update Opportunity Process to create revenue items for all quote line items;
     a Submit Order Process to associate account information with each line item in an
         order and set the status of the order to "open";

an Ungroup Quotes Process to create multiple copies of line items in a quote that
    have quantities greater than one;

an Apply Completed Sales Order Line Item To Service Profile Process to update
    an asset table for a complex asset that has been provisioned; and

a Move Process to transfer a customer's complex asset configuration from an old
    location to a new location by entering the address of the new location and
    entering a single option selection.

42.   The apparatus of claim 41, wherein the Modify Products and Services
Process comprises:

means for retrieving the quote that is selected;

means for creating the quote if no quote is selected;

means for allowing the user to make changes to the currently requested state of the
    complex asset;

means for applying changes specified by all open and pending orders related to
    the complex asset to simulate the state of the service product;

means for returning an empty asset when the open and pending order disconnects
    a root component of the complex asset;

means for allowing the user to change the configuration of the complex asset
    when the complex asset is customizable;

means for updating the quote with the change between the previously requested
    state of the complex asset and the newly requested state of the complex
    asset; and

means for storing the updated quote.

43.   The apparatus of claim 41, wherein the Edit Quotes Line Items Process
comprises:

means for determining whether the status of the action code of an order line item
    is "Add";

means for generating the requested future state of the complex asset by applying
    the prior active and unprocessed orders to the complex asset;

means for applying the current quote line item to the complex asset;

5   means for allowing the user to reconfigure the complex asset; and

   means for generating the difference between the requested state of the complex

     asset before the current order line item was applied and the state of the

     asset after the user reconfigured the complex asset.

   44. The apparatus of claim 41, wherein the Edit Order Line Items Process

10 comprises:

   means for determining whether the status of the action code of an order line item

     is "Add";

   means for generating the requested future state of the complex asset by applying

     the prior active and unprocessed orders to the complex asset;

15   means for applying the current order line item to the complex asset;

   means for displaying the currently requested state of the complex asset and allow

     the user to reconfigure the complex asset; and

   means for generating the difference between the requested state of the complex

     asset before the current order line item was applied and the state of the

20   asset after the user reconfigured the complex asset; and

   means for ungrouping any order line item with a quantity of more than 1 into

     multiple line items, each with a quantity of 1.

   45. The apparatus of claim 41, wherein the Apply Completed Sales Order Line

Item To Service Profile Process comprises:

25   means for updating an Order Item Processed flag of the topmost order line item

     based on whether all line items have a status of Complete.

   means for trimming any incomplete or failed changes from the order line items

     whose products are not tracked as assets, line items whose status is not

     Complete, and line items whose action code is "-";

30   means for converting action codes of the order line items from Delete to Update;

   means for loading the complex asset associated with the order line item from the

     database;

   means for creating a new complex asset if there is no complex asset associated

     with the order line item;

35   means for applying the order line item to the complex asset; and

5   means for storing the complex asset.

46.   The apparatus of claim 41, wherein the Move Process comprises:

means for identifying a move-out address;

means for identifying a move-in address;

means for retrieving the complex assets for the move-out address;

10   means for generating a move-in quote with line items from the complex assets for
the move-out address;

means for adding account information from the complex asset for the move-out
address to the move-in quote;

means for generating two quote line items for each quote line item in the move-

15   out quote, wherein one quote line item has an action code of Delete and is
associated with the move-out address, and the other quote line item has an
action code of Add and is associated with the move-in address.

means for specifying a completed date for the move-out quote;

means for assigning a service point to each quote line item to be connected in the

20   move-in quote; and

means for specifying a connect date for the move-in quote.

47.   The apparatus of claim 38, wherein the Apply Method comprises:

means for retrieving a complex asset representing a customizable product;

means for overlaying unprocessed items and attributes of the customizable

25   product from all of the open orders on the complex asset, wherein all of
the open orders are represented in a property set in chronological order;

means for generating a new property set representing the combination of the
complex asset and the open orders; and

means for setting the hierarchy of the new property set to reflect the hierarchy of

30   the open order.

48.   The apparatus of claim 38, wherein the Delta Method comprises:

means for determining when a change in the hierarchy occurs between a non-
primary complex object and a primary complex object;

means for allowing the user to indicate item fields and attributes in the two
complex objects to be compared;

means for changing the action code of an item to 'Add' when a new product is
included in the non-primary complex object and not included in the
primary complex object;

means for changing the action code of an item to 'Delete when a new product is
included in the primary complex object and not included in the non-
primary complex object;

means for changing the action code of a child item to 'Update' when no other
action is indicated;

means for changing the action code of an item to 'Update' when the non-primary
complex object's item and corresponding attribute(s) are added to the
primary complex object; and

means for changing the action code of the attribute of the item to:
'Update' when the attribute data has changed;
'Add' when the attribute has been added;
'Delete' when the attribute has been deleted; and
'-' (blank) when the attribute data has not changed,

when the action code of an item is changed to 'Update'.

49.   The apparatus of claim 38, wherein the Trim Method comprises:

means for receiving a complex object, wherein the complex object represents a
quotes, orders, and a service profile;

means for receiving a trim specification, wherein the trim specification is a delta
order

means for beginning with the top-most item in the complex object hierarchy, and
proceeds recursively down through the root items to the trim any items and
the children of the items that match criteria in the trim specification; and

means for allowing syntax for the trim specification to support arithmetic
functions and logical operators.

50.   A method for processing orders comprising:

generating a customer portal comprising a list of products and services associated with an account, a list of quotes associated with the account, a list of orders associated with the account, and a plurality of user-selectable options, wherein the customer portal is accessible by users including customer service representatives, customers, and service providers for the customers;

invoking a workflow process, and the workflow process invokes at least one business service method to perform functions associated with the selected option;

receiving at least one of: a service profile, quote information, and order information pertaining to an account;

generating a business object based on the at least one of: a service profile, quote information, and order information; and

transforming at least a portion of the business object to a complex object.

51.   The method of claim 50, further comprising:

instructions operable to update the status of order line items when a provisioning system completes all or part of an order.

52.   The method of claim 50, wherein the plurality of business service methods include at least one of:

an Apply Method to create a hybrid asset/order that simulates the future configuration of the complex object by overlaying unprocessed items and attributes from open orders on one of the plurality of complex objects that is based on the complex object;

a Delta Method to generate a delta complex object that represents the difference between at least two of the plurality of complex objects;

a Trim Method to create a new complex object by eliminating all items that meet predefined trim criteria from one of the plurality of complex objects;

a Logical Delete Method to generate a transformed delta order complex object by transforming items in one of the plurality of complex objects with an action code "Delete" to "Update" and changing status of the transformed items to "Inactive";

5   an Explode Method to copy items in one of the plurality of complex objects with
quantity greater than one, and generate a delta quote complex object with a
corresponding number of copies of the item with quantity equal to one;

a Fully Exploded Method to determine whether the items in one of the plurality of
complex objects have a quantity greater than one;

10   a Field Delta Method to set the action code of a parent quote item to "Update"
when a specified field is updated;

a Set Effectivity Dates Method to generate a "Calculated Effective End Date", a
"Calculated Effective Start Date", and a "Completed Date", wherein the
"Calculated Effective End Date" is set to the date the action code of an

15   item in one of the plurality of complex objects based on an order was set to
"delete", the "Calculated Effective Start Date" is set to the date the action
code of the item in the one of the plurality of complex objects was set to
"add", and the "Completed Date" is set to the date the order was
completed;

20   a Set Action Method to set the action code of an item in one of the plurality of
complex objects;

a Save Object Method to receive a key and a property set hierarchy that represents
one of the plurality of complex objects, and saves the one of the plurality
of complex objects in a string to object map using the key;

25   a Get Object Method to receive the key and return the one of the plurality of
complex objects that corresponds to the key;

a Reset Method to delete all saved complex objects from the map;

a Module Licensed Method to determine whether the complex order processing
system is licensed for a particular computer system;

30   an Update Order Status Method to check a Status field of a root item and all child
items in the hierarchy of one of the plurality of complex objects based on a
complex object to determine whether the Status field is set to "Complete",
"Failed" or NULL;

a Merge Method to copy all items from one of the plurality of complex objects to

35   another of the plurality of complex objects;

a Set Field Method to enumerate through the item hierarchy of one of the plurality
of complex objects, find a named field of each item, and set the named
field to a specified value; and

a Create Empty Complex Object Method to create an empty complex object based
on one of the plurality of complex objects.

53.   The method of claim 50, wherein the workflow process comprises:

a Supplemental Orders Process to create a new order by allowing the user to
revise a pending order, wherein the Supplemental Orders Process
comprises:

means to generate the requested future state of the complex object by applying the
prior active and unprocessed orders to the complex object;

means to apply a current order line item to the complex object;

means to allow the user to reconfigure the complex object; and

means to generate the difference between the requested state of the complex
object before the current order line item was applied and the state of the
object after the user reconfigured the complex object; and

means to ungroup any order line item with a quantity of more than 1 into multiple
line items, each with a quantity of 1..

54.   The method of claim 36, wherein the workflow process comprises:

a Move Process to transfer a customer's asset configuration from an old location
to a new location by entering the address of the new location and entering
a single option selection to transfer the asset configuration from the old
location to the new location.

55.   The method of claim 50, wherein the workflow process comprises at least
one of:

a New Products and Services Process to create a quote;

a Modify Products and Services Process to modify a complex asset in a quote;

a Disconnect Products and Services Process to disconnect a complex asset;

a Profile Process to retrieve account information that corresponds to a quote;

an Edit Quotes Line Items Process to apply all active and unprocessed orders to a
complex asset to generate the future state of the complex asset, and allow
the user to make changes to the configuration of the complex asset and
update a quote;

a Supplemental Orders Process to create a new order by allowing the user to
revise a pending order;

an Edit Order Line Items Process to apply all active and unprocessed orders to a
complex asset to generate the future state of the complex asset, allow the
user to make changes to the configuration of the complex asset, and update
an order;

a Quote to Order Process to convert a quote to a sales order;

an Update Opportunity Process to create revenue items for all quote line items;

a Submit Order Process to associate account information with each line item in an
order and set the status of the order to "open";

an Ungroup Quotes Process to create multiple copies of line items in a quote that
have quantities greater than one;

an Apply Completed Sales Order Line Item To Service Profile Process to update
an asset table for a complex asset that has been provisioned; and

a Move Process to transfer a customer's complex asset configuration from an old
location to a new location by entering the address of the new location and
entering a single option selection.

56.   The method of claim 55, wherein the Modify Products and Services
Process comprises:

retrieving the quote that is selected;

creating the quote if no quote is selected;

allowing the user to make changes to the currently requested state of the complex
object;

applying changes specified by all open and pending orders related to the complex
object to simulate the state of the service product;

returning an empty asset when the open and pending order disconnects a root
component of the complex object;

5   allowing the user to change the configuration of the complex object when the
complex object is customizable; and

updating the quote with the change between the previously requested state of the
complex object and the newly requested state of the complex object.

10   57.   The method of claim 55, wherein the Edit Quotes Line Items Process
comprises:

determining whether the status of the action code of an order line item is "Add";

generating the requested future state of the complex object by applying the prior
active and unprocessed orders to the complex object;

15   applying the current quote line item to the complex object;

allowing the user to reconfigure the complex object; and

generating the difference between the requested state of the complex object before
the current order line item was applied and the state of the asset after the
user reconfigured the complex object.

20   58.   The method of claim 55, wherein the Edit Order Line Items Process
comprises:

determining whether the status of the action code of an order line item is "Add";

generating the requested future state of the complex object by applying the prior
active and unprocessed orders to the complex object;

25   applying the current order line item to the complex object;

displaying the currently requested state of the complex object and allow the user
to reconfigure the complex object; and

generating the difference between the requested state of the complex object before
the current order line item was applied and the state of the asset after the

30   user reconfigured the complex object; and

ungrouping any order line item with a quantity of more than 1 into multiple line
items, each with a quantity of 1.

59.   The method of claim 55, wherein the Apply Completed Sales Order Line
Item To Service Profile Process comprises:

updating an Order Item Processed flag of the topmost order line item based on
whether all line items have a status of Complete.

trimming any incomplete or failed changes from the order line items whose
products are not tracked as assets, line items whose status is not Complete,
and line items whose action code is "-";

converting action codes of the order line items from Delete to Update;

loading the complex object associated with the order line item from the database;

creating a new complex object if there is no complex object associated with the
order line item;

applying the order line item to the complex object; and

storing the complex object.

60.   The method of claim 55, wherein the Move Process comprises:

identifying a move-out address;

identifying a move-in address;

retrieving the complex objects for the move-out address;

generating a move-in quote with line items from the complex objects for the
move-out address;

adding account information from the complex object for the move-out address to
the move-in quote;

generating two quote line items for each quote line item in the move-out quote,
wherein one quote line item has an action code of Delete and is associated
with the move-out address, and the other quote line item has an action
code of Add and is associated with the move-in address.

specifying a completed date for the move-out quote;

assigning a service point to each quote line item to be connected in the move-in
quote; and

specifying a connect date for the move-in quote.

61.   The method of claim 52, wherein the Apply Method comprises:

retrieving a complex object representing a customizable product;

5   overlaying unprocessed items and attributes of the customizable product from all
                of the open orders on the complex object, wherein all of the open orders
                are represented in a property set in chronological order;
           generating a new property set representing the combination of the complex object
                and the open orders; and
10   setting the hierarchy of the new property set to reflect the hierarchy of the open
                order.

           62.   The method of claim 52, wherein the Delta Method comprises:
           determining when a change in the hierarchy occurs between a non-primary
                complex object and a primary complex object;
15   allowing the user to indicate item fields and attributes in the two complex objects
                to be compared;
           changing the action code of an item to 'Add' when a new product is included in
                the non-primary complex object and not included in the primary complex
                object;
20   changing the action code of an item to 'Delete when a new product is included in
                the primary complex object and not included in the non-primary complex
                object;
           changing the action code of a child item to 'Update' when no other action is
                indicated;
25   changing the action code of an item to 'Update' when the non-primary complex
                object's item and corresponding attribute(s) are added to the primary
                complex object; and
           changing the action code of the attribute of the item to:
                'Update' when the attribute data has changed;
30   'Add' when the attribute has been added;
                'Delete' when the attribute has been deleted; and
                '-' (blank) when the attribute data has not changed,
           when the action code of an item is changed to 'Update'.

           63.   The method of claim 52, wherein the Trim Method comprises:

5   receiving a complex object, wherein the complex object represents a quotes, orders, and a service profile;

receiving a trim specification, wherein the trim specification is a delta order beginning with the top-most item in the complex object hierarchy, and proceeds recursively down through the root items to the trim any items and the

10   children of the items that match criteria in the trim specification; and

allowing syntax for the trim specification to support arithmetic functions and logical operators.

64.   A computer program product comprising: instructions to implement the method of claim 50.

15   65.   A data signal in a carrier medium comprising: instructions to implement the method of claim 50.

66.   A method of processing orders comprising:

detecting selection of an option to transfer a customer's complex asset configuration from an old location to a new location;

20   copying the complex asset configuration into a quote with a status indicator to add the complex asset configuration to the new location; and

copying the complex asset configuration into another quote with a status indicator to disconnect the complex asset configuration at the old location.